

REMARKS

In the Office Action, the Examiner rejected claims 1, 2, 4-17, 19, 20, and 22-24 pursuant to 35 U.S.C. § 103(a) as unpatentable over Halmann, et al. (U.S. Patent No. 7,115,093) in view of Stevens (US 5,678,551).

Applicants respectfully request reconsideration of the rejections of claims 1-2, 4-17, 19-20, and 22-24, including independent claims 1, 11, 16 and 20.

Independent claim 1 recites an analog-to-digital converter between the transducer and the releaseable connector where a coaxial cable connects the ultrasound transducer to the analog-to-digital converter and a housing connects with the end of the coaxial cable and is at least partially around the releasable connector and the analog-to-digital converter. Halmann, et al. and Stevens do not disclose these limitations.

Halmann, et al. have a handheld probe assembly 2 that has two parts, a detachable transducer head 10 and a beamforming module 40 (Figs. 1, 1B, 4 and 5; and col. 2, lines 55-60). The ADC is in the beamforming module 40 of the assembly 2 (col. 3, lines 37-7). A common PDA connects via a cable to this assembly 2 (Figs. 1 and 1B; and col. 3, lines 29-39). To operate with the PDA, a computer interface, like a USB or parallel interface, is used between the PDA 120 and the beamforming module 40 of the assembly 2 (col. 3, lines 29-39).

There is no cable between the transducer 20 and the ADC 80. A person of ordinary skill would not have used a cable between the detachable transducer head 10 and the beamforming module 40 since Halmann, et al. teach these pieces together forming a single handheld assembly 2 (Figs. 1, 1B, 4 and 5; col. 2, lines 60-62; and col. 3, lines 51-54). There is a good reason for this teaching. A user only has two hands, so the assembly 2 and PDA 120 are the two components separated by a cable. Using a cable between the head 10 and the module 40 would result in 3 devices, for only two hands. As a result, a person of ordinary skill in the art would not have used a cable between the transducer of the head 10 and the ADC 80 of the module 40, both of which are provided as one assembly 2.

Using coax between the assembly 2 and the PDA 120 for the interface 150 results in the ADC not being connected to the transducer by coax as recited in claim 1.

Stevens is cited for the coaxial cable (Office Action, page 3). Stevens does not disclose an ADC and its positioning.

Claim 1 also recites that the coaxial cable has a length longer than a longest dimension of a probe housing the ultrasound transducer. Such length of cable would not be provided within the assembly 2 as the components (head 10 and module 40) flush mount as shown (Fig. 1). The electrical connection relied on by the Examiner is not appropriate for a flush mount of an assembly to be held in one hand.

Claim 1 also recites that at least part of the coaxial cable is outside of the connector housing and the probe housing. The electrical connection between the transducer and A/D converter in the same assembly 2 with a flush mount (see Fig. 1B) is not outside of the housing.

Independent claim 11 recites a detachable transducer assembly with an analog-to-digital converter in a connector housing, with a cable extending between the transducer probe and the connector housing and outside of both. As discussed above for claim 1, Halmann, et al. position the head 10 and module 40 together in one assembly 2 and would not use a cable for this flush mount.

Independent claim 16 is allowable for similar reasons. The cable in Halmann, et al. is not in the correct position.

Independent claim 20 recites transmitting electrical signals through a cable of the probe assembly, the cable spacing the connector housing from the probe housing, and converting the electrical signals into digital data within a connector housing of the probe assembly. Claim 20 is allowable for the same reasons as claim 1.

Dependent claims 2, 4-10, 12-15, 17, 19 and 22-24 each depend from one of the independent claims above, so are each allowable for at least the same reasons as the corresponding base claim. Further limitations distinguish from the cited references.

Claim 7 recites a partial beamformer. Halmann, et al. use a complete or full beamformer 90.

Claim 9 recites a switch between the ultrasound transducer and the analog-to-digital converter to bypass analog signals. Halmann, et al. do not provide an analog bypass.

Claim 10 recites a demux and serializers. Halmann, et al. do not disclose these components.

Claim 13 recites a demultiplexer. The cited references do not use a demux.

Claim 14 recites a serializer housed by the connector housing. The cited references do not use a serializer.

Claim 17 is allowable for similar reasons as claim 1.

Claim 19 recites partial beamforming, but Halmann, et al. use full beamforming.

Claim 23 recites demultiplexing the signals after converting and before passing. Halmann, et al. do not demultiplex.

CONCLUSION:

Applicants respectfully submit that all of the pending claims are in condition for allowance and seeks early allowance thereof.

PLEASE MAIL CORRESPONDENCE TO:

Siemens Corporation

Customer No. 28524

Attn: Elsa Keller, Legal Administrator
170 Wood Avenue South
Iselin, NJ 08830

Respectfully submitted:
/Jenny G. Ko/

Jenny Ko, Reg. No. 44,190
Attorney for Applicant(s)
650-694-5330
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